6.6 Montgomery County, Maryland: Using the BCG to Communicate with the Public and Inform Management Decisions

6.6.1 Key Message

Montgomery County helped to developed a BCG ~~for a near pristine watershed (e.g., undisturbed/minimally disturbed conditions)~~ to better inform the public and county decision-makers ~~on the~~ about a near pristine watershed (e.g., undisturbed/minimally disturbed conditions) ~~condition of the streams~~ and the predicted outcome of planned development. Local government decision-makers were able to understand how these high quality streams compared to other streams in Montgomery County and Maryland. ~~The information informed local government decision-making so that d~~Development plans were modified to protect the streams and watershed and reduce environmental impacts, while allowing development to proceed.

6.6.2 Background: Early County Policy

In 1994, the Maryland-National ~~Capitol~~ Capital Park and Planning Commission (M-NCPPC) adopted the *Clarksburg Master Plan & Hyattstown Special Study Area*. The Plan established goals for development of Clarksburg, Maryland, at that time a mostly undeveloped area along a six to eight lane highway corridor outside the Washington, DC metropolitan area. The Plan's goals included development of the town with emphasis on maintaining farmland and open space and promotion of transit-oriented neighborhoods (M-NCPPC 1994). One critical objective of the plan was the protection of environmental resources while accommodating development, such as affording special protection to high quality stream systems, including tributaries to the streams and associated wetlands. The plan specified that development occur in four phases, with requirements that must be met in order for development to proceed from one phase to the next. This staging allowed~~s~~ for consideration of new data and information on the impacts of development on streams and rivers, as well as improvements in mitigation technology and changes in county, state, or federal policies or regulations that might affect implementation of the 1994 plan. For example, in 2008, the County revised the 1994 plan to meet the newly adopted state law requiring the use of Environmental Site Design (ESD) practices to minimize stormwater runoff throughout the county.

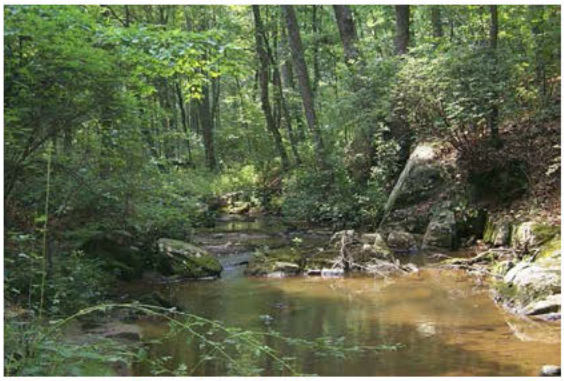

Figure 1. Ten Mile Creek, Maryland

Development in one of the high quality areas slated for development, Ten Mile Creek (TMC) (Figure 1), was afforded special protection under the Master Plan. TMC, a subwatershed[1] of the Little Seneca Creek watershed was assigned to stage four to ~~assure~~ ensure that the 1994 development plan could be reviewed and potentially adjusted based on relevant new data and information. This case example

[1] A subwatershed is the topographic perimeter of a stream catchment~~.~~

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Commented [MC1]: Kenny and Jennifer: what HUC level is most relevant from your perspective? We can insert any of the below:

HUC 8 – 02070008 - Middle Potomac-Catoctin
HUC 10 – 0207000808 – Seneca Creek
HUC 12 – 020700080801 – Little Seneca Creek

shows how the BCG was used to provide information on current conditions in TMC relative to other county subwatersheds and streams in *excellent* *good*, *fair*, or *poor* condition. Information from the BCG was used in conjunction with other data to help inform the ~~county~~ County ~~council~~ Council in their deliberation on whether or not to adjust the stage four development plan.

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6.6.2.1 Ten Mile Creek Subwatershed, Stream, and Tributaries

The TMC subwatershed, stream, and tributaries comprise a headwater stream system in which the majority of tributaries are small and spring fed. Abundant springs and seeps supply cold and clean water that supports a diverse community of fish, benthic macroinvertebrates, and amphibians (Boucher, personal communication, 2014) (Figure 2). The area is highly forested with a low level of impervious surface, < 1% to 3%. TMC is one of three reference streams remaining in the county and has supported *good* to *excellent* conditions based on a long term data set using IBIs for benthic macroinvertebrates and for fish that were developed by the county (MCDEP 2012). TMC and its tributaries are adjacent to both Little Bennett Creek, a natural resource conservation management area, and to the county's agricultural ~~preserve~~reserve, providing not only a bridge between these two protected areas but also a cost efficient opportunity to maintain natural flows, clean water, and high biological diversity, and provide for recreational use and appreciation by the public (Figure 3).

Commented [m2]: One of three reference watersheds (Little Bennett, Upper Patuxent, Ten Mile Creek)

Figure 2. Important aquatic species in Maryland's Piedmont headwater streams. Salamanders (Long-tailed, Northern Dusky, and Northern Red); fishes (Potomac Sculpin, Rosyside Dace, American Eel); Insects (Sweltsa, Paraleptophlebia, Ephemerella).

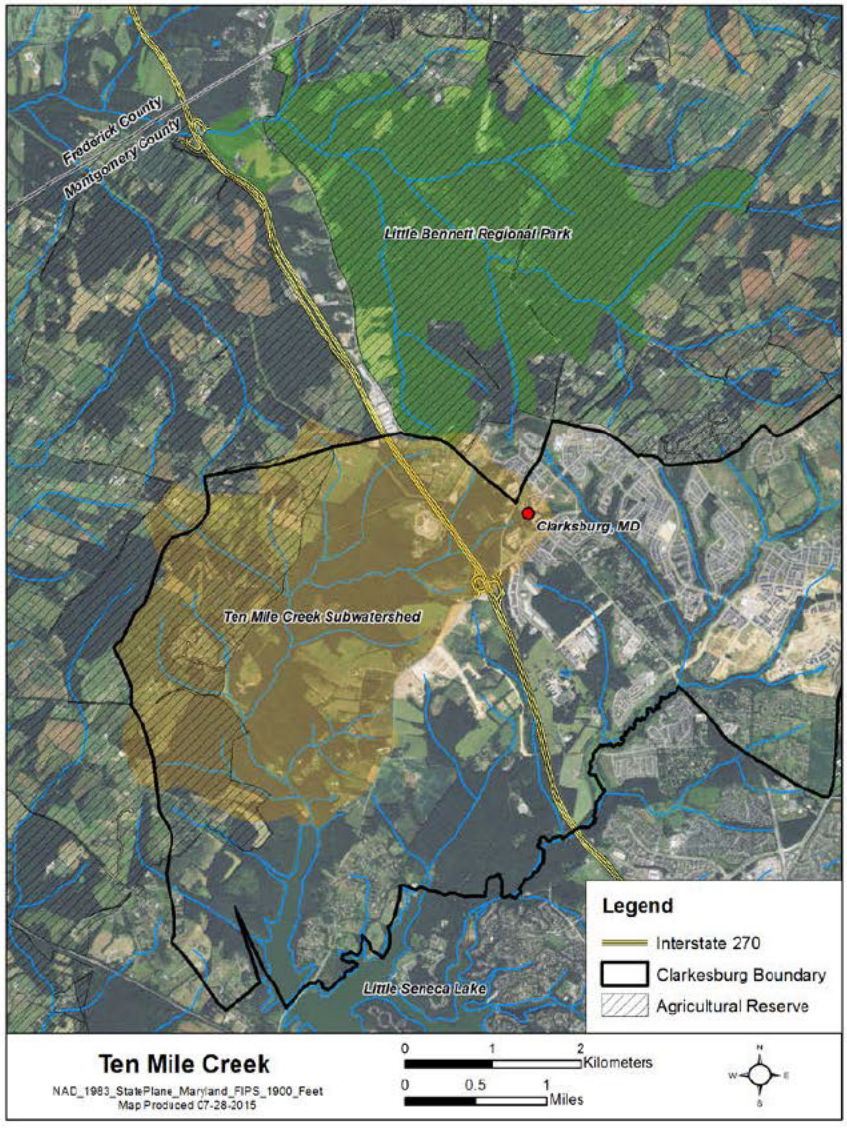

Figure 3. Clarksburg Area and Ten Mile Creek Subwatershed

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6.6.2.2 Monitoring the Impacts of Development

Beginning in 1994, the Montgomery County Department of Environmental Protection (MCDEP) monitored conditions throughout the Clarksburg development area as construction progressed. Analysis included evaluating the effectiveness of best management practices and regulations to minimize both the immediate impacts from construction and the longer term impacts from the subsequent development. Annual monitoring reports were published beginning in 2001 (e.g., MCDEP 2009, 2012). Initial monitoring found stream conditions in Clarksburg development area ranged from *good* to *excellent* in most sensitive, high quality areas such as the TMC subwatershed. However, by the mid-2000s, the water quality at several good quality streams in the urbanizing areas began to degrade from *good* to *fair* (MCDEP 2009, M-NCPPC 2014a). In October 2012, the Montgomery County Council directed the County Planning Board to undertake a limited amendment of the 1994 Clarksburg Master Plan. Monitoring of earlier Clarksburg developments ~~because the monitoring data and environmental analysis~~ showed uncertainty about the ability to protect the sensitive environmental resources ~~scheduled for stage four development~~found in the sta~~t~~ge four development area, such as TMC subwatershed, if full development were to occur according to the original 1994 plan.

Commented [m4]: "biological stream condition" or "stream health" might be better phrasing

A number of scientific analyses informed the development of the *Ten Mile Creek Area Limited Amendment to the Clarksburg Master Plan and Hyattstown Special Study Area*. County staff sought to use their extensive monitoring data to further characterize the watershed and to identify analytical ways to present information on the environmental status of County waters. Specifically, staff wanted to assess the current conditions in those waters and the expected changes that would occur in relation to further development in the area. In an effort to further characterize and assess incremental changes in local biological conditions, in 2013 the County embarked on the process of developing a BCG model for the Piedmont region of Maryland using data for fish and benthic macroinvertebrate assemblages (USEPA 2013b). Observations on the presence of salamanders were also incorporated where data were available. The presence of stream salamander species such as the northern dusky salamander, long tailed salamander, northern two-lined salamander, and the northern red salamander aided in confirming high quality of streams.

6.6.3 Development of the BCG

The County saw the BCG as one way to provide more refined and detailed information on streams and their response to land use change. In 2013, scientists from agencies within the state, Delaware, Pennsylvania, Virginia, EPA, consulting groups, and academia convened as an expert panel to develop a BCG for the Northern Piedmont. The goal of this effort was to use data collected primarily from Montgomery County to develop a BCG model to describe changes in the biota in response to increasing stress in the landscape. For example, a BCG level 2 waterway would be minimally disturbed and include the presence of native top predator fish (e.g., brook trout) as well as mayflies, stoneflies, and caddisflies. A BCG level 3 or 4 water would include incrementally higher loss of sensitive species and an increased abundances of tolerant species (e.g., ~~red salamander~~blacknose dace and northern two-lined salamander). A BCG level 5–6 water would show an abundance of highly tolerant species (e.g., brown bullhead, tubificid and naidid worms).

Experts at the workshop were able to distinguish five distinct levels of biological condition for the Piedmont region within Montgomery County (BCG levels 2–6). Most TMC sites ranged from a level 3+ to a level 4, although several sites (e.g., headwater streams) were judged as very good quality (a level 2-rating). Narrative and numeric decision rules to consistently describe and quantify site assessments were developed based on mathematical set theory using the fuzzy logic method (Tables 1–3) and taxa response relationships derived from the county datasets (Figure 4).

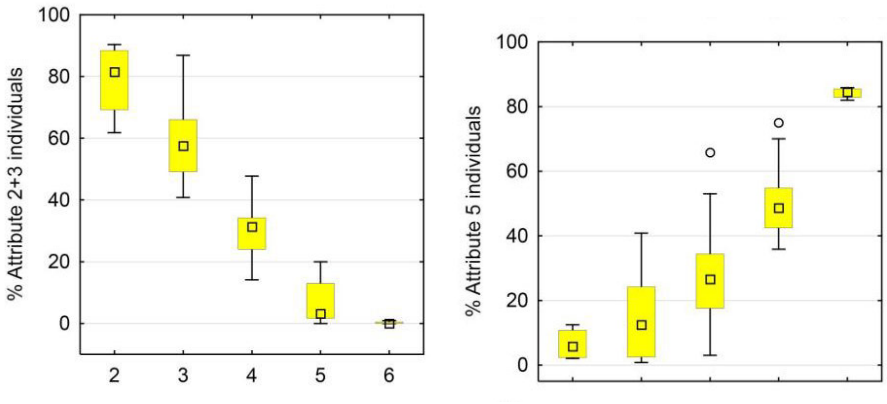

Figure 4. Box plots of sensitive (Attribute 2+3) and tolerant (Attribute 5) percent taxa and percent individual metrics for macroinvertebrate calibration samples, grouped by nominal BCG level (expert consensus). Source: Stamp et al. 2014.

Table 1. Description of fish, salamander and macroinvertebrate assemblages in each assessed BCG level. Definitions are modified after Davies and Jackson (2006).

BCG level 1	**Definition:** Natural or native condition - ***native structural, functional and taxonomic integrity is preserved; ecosystem function is preserved within the range of natural variability***
	Narrative from expert panel: There are no BCG Level 1 sites within the Piedmont. All sites have some degree of disturbance, including legacy effects from agriculture and forestry from 100 to 200 years ago. Conceptually, BCG Level 1 sites would have strictly native taxa for all assemblages evaluated (fish, salamander, benthic macroinvertebrates), some endemic species, and evidence of connectivity in the form of migratory fish.
	Fish: Examples of endemic species that might be present (depending on the size of the stream) include: Bridle Shiner, Brook Trout, Chesapeake Logperch, Maryland Darter, Trout Perch
	Macroinvertebrates: Sensitive-rare, cold water indicator taxa such as the mayfly Epeorus, and stoneflies Sweltsa and Talloperla are expected to be present
BCG level 2	**Definition:** Minimal changes in structure of the biotic community and minimal changes in ecosystem function - ***virtually all native taxa are maintained with some changes in biomass and/or abundance; ecosystem functions are fully maintained within the range of natural variability***
	Narrative from expert panel: Overall taxa richness and density is as naturally occurs (watershed size is a consideration). These sites have excellent water quality and support habitat critical for native taxa. They have many highly sensitive taxa and relatively high richness and abundance of intermediate sensitive-ubiquitous taxa. Many of these taxa are characterized by having limited dispersal capabilities or are habitat specialists. If tolerant taxa are present, they occur in low numbers. There is connectivity between the mainstem, associated wetlands and headwater streams.
	Fish: Highly sensitive (Attribute II) and intermediate sensitive (Attribute III) taxa such as yellow perch, northern hog sucker, margined mad tom, fallfish and fantail darter are present, as are native top predators (e.g., brook trout). Migratory fish and amphibians (e g., eel, lamprey, salamanders) are present or known to access the site. Long-tailed and Dusky salamanders are also good indicators, given a complimentary fish community. Non-native taxa such as brown trout or rainbow trout, are absent or, if they occur, their presence does not displace native trout or alter structure and function.
	Macroinvertebrates: Highly sensitive taxa are present - especially coldwater indicator mayflies, stoneflies, and caddisflies (e.g, Epeorus, Paraleptophlebia, Sweltsa, Tallaperla and Wormaldia) - and occur in higher abundances than in BCG level 3 samples.
BCG level 3	**Definition:** Evident changes in structure of the biotic community and minimal changes in ecosystem function - ***Some changes in structure due to loss of some rare native taxa; shifts in relative abundance of taxa but intermediate sensitive taxa are common and abundant; ecosystem functions are fully maintained through redundant attributes of the system***
	Narrative from expert panel: Generally considered to be in good condition. Similar to BCG level 2 assemblage except the proportion of total richness represented by rare, specialist and vulnerable taxa is reduced. Intermediate sensitive-ubiquitous taxa have relatively high richness and abundance. Taxa with intermediate tolerance may increase but generally comprise less than half total richness and abundance. Tolerant taxa are somewhat more common but still have low abundance. Taxa with slightly broader temperature or sediment tolerance may be favored.

	Fish: Intermediate sensitive (Attribute III) taxa such as fallfish and fantail darter are common or abundant. Taxa of intermediate tolerance (Attribute IV) such as channel catfish, least brook lamprey, pumpkinseed and tessellated darter are present in greater numbers than in BCG level 2 samples. Some tolerant (Attribute V) taxa such as mummichog and white suckers may be present, but highly tolerant taxa are absent. Pioneering speices such as blacknose dace, creek chubs and white suckers may be naturally common in smaller streams. Migratory species such as American Eel may be absent. Two-lined salamanders may occur.
	Macroinvertebrates: Similar to BCG level 2 assemblage except sensitive taxa (e g, Sweltsa, Tallaperla and Wormaldia) occur in lower numbers. Level 3 indicator taxa include the caddisfly Diplectrona, the mayfly Ephemerella and the stonefly Amphinemura.
BCG level 4	**Definition:** Moderate changes in structure of the biotic community and minimal changes in ecosystem function - *Moderate changes in structure due to replacement of some intermediate sensitive taxa by more tolerant taxa, but reproducing populations of some sensitive taxa are maintained; overall balanced distribution of all expected major groups; ecosystem functions largely maintained through redundant attributes*
	Narrative from expert panel: Sensitive species and individuals are still present but in reduced numbers (e.g., approximately 10 – 30% of the community rather than 50% found in Level 3 streams). The persistence of some sensitive species indicates that the original ecosystem function is still maintained albeit at a reduced level. Densities and richness of intermediate tolerance taxa have increased compared to BCG level 3 samples.
	Fish: 2 or 3 sensitive taxa may be present but occur in very low numbers (e.g., Blue Ridge Sculpin, Fantail Darter, Potomac Sculpin, Fallfish, Rosy-side Dace, River Chub). Taxa of intermediate tolerance (Attribute IV) such as tesselated darter, least brook lamprey, longnose dace are common, as well as tolerant taxa like yellow bullhead, red-breast sunfish and bluntnose minnow. Level 4 streams may harbor 2 to 3 salamander species (Dusky, Red, and Two-lined).
	Macroinvertebrates: Sensitive taxa (including EPT taxa) are present but occur in low numbers. Taxa such as Diplectrona and Dolophilodes may occur, but other key taxa such as Ephemerella and Neophylax are absent. Taxa of intermediate tolerance (e.g., Baetis, Stenonema, Caenis, Chimarra, Cheumatopsyche, Hydropsyche) occur in greater numbers. Tolerant taxa such as Chironomini and Orthocladiinae are present but do not exhibit excessive dominance.
BCG level 5	**Definition:** Major changes in structure of the biotic community and moderate changes in ecosystem function - *Sensitive taxa are markedly diminished; conspicuously unbalanced distribution of major groups from that expected; organism condition shows signs of physiological stress; system function shows reduced complexity and redundancy; increased build-up or export of unused materials*
	Narrative from expert panel: Overall abundance of all taxa reduced. Sensitive species may be present but their functional role is negligible within the system. Those sensitive taxa remaining are highly ubiquitous within the region and have very good dispersal capabilities. The most abundant organisms are typically tolerant or have intermediate tolerance, and there may be relatively high diversity within the tolerant organisms. Most representatives are opportunistic or pollution tolerant species.
	Fish: Facultative species reduced or absent. Tolerant taxa like yellow bullhead, red-breast sunfish, and bluntnose minnow are common. Blacknose dace, creek chubs and white suckers may dominate. Two-lined salamanders might be the only salamander present.
	Macroinvertebrates: Highly sensitive macroinvertebrate taxa are usually absent and Chironomid midges (mostly tolerant Orthocladiinae and Chironomini) often comprised >50% of the community in Level 5 streams.

BCG level 6	**Definition:** Major changes in structure of the biotic community and moderate changes in ecosystem function - *Sensitive taxa are markedly diminished; conspicuously unbalanced distribution of major groups from that expected; organism condition shows signs of physiological stress; system function shows reduced complexity and redundancy; increased build-up or export of unused materials*
	Narrative from expert panel: Heavily degraded from urbanization and/or industrialization. Can range from having no aquatic life at all or harbor a severely depauperate community composed entirely of highly tolerant or tolerant invasive species adapted to hypoxia, extreme sedimentation and temperatures, or other toxic chemical conditions.
	Fish: Fish are low in abundance or absent, represented mainly by blacknose dace, green sunfish, bluntnose minnow or creek chub.
	Macroinvertebrates: May be dominated by tolerant non-insects (Physid snails; Planariidae; Oligochaeta; Hirudinea; etc.)

Table 2. BCG quantitative decision rules for macroinvertebrate assemblages. The numbers in parentheses represent the lower and upper bounds of the fuzzy sets.

BCG Level 2	rule	
# Total taxa	> 17 (13–22)	
% Attribute 2 taxa	≥ 8% (5–10)	
% Attribute 2+3 taxa	≥ 50% (45–55)	
% Attribute 2 individuals	≥ 3% (2–5)	
% Attribute 2+3 individuals	≥ 60% (55–65)	
% Attribute 5 individuals	≤ 15% (10–20)	
BCG Level 3	**alt 1**	**alt 2**
# Total taxa	> 17 (13–22)	
% Attribute 2+3 individuals	≥ 40% (35–45)	
# Attribute 2 taxa	—	≥ 1 (0–2)
% Attribute 2+3 taxa	≥ 25% (20–30)	≥ 45% (40–50)
% Attribute 5 individuals	≤ 40% (35–45)	≤ 50% (45–55)
% Most dominant Attribute 5 individual	≤ 20% (15–25)	—
BCG Level 4	**rule**	
# Total taxa	≥ 15 (10–20)	
% Attribute 2+3 taxa	≥ 20% (15–25)	
% Attribute 2+3 individuals	≥ 10% (5–15)	
% Attribute 5 individuals	≤ 70% (65–75)	
% Most dominant Attribute 5 individual	≤ 60% (55–65)	
BCG Level 5	**rule**	
# Total taxa	≥ 8 (6–10)	
% Attribute 5 individuals	≤ 85% (80–90)	
% Most dominant Attribute 5 individual	≤ 70% (65–75)	

Table 3. BCG quantitative decision rules for fish assemblages in small (0.5–1.4 mi²), medium (1.5–7.9 mi²) and larger streams (> 8 mi²). The numbers in parentheses represent the lower and upper bounds of the fuzzy sets. The mid-water cyprinid taxa metric is comprised of notropis, luxilus, clinostomus, and cyprinella, minus swallowtail shiners.

BCG Level 2	Small		Medium		Large
	rule	alt rule	rule	alt rule	rule
# Attribute 1 taxa	> 0 (present)		> 0 (present)		–
# Attribute 1+2 taxa	–		≥ 2 (1-4)		≥ 4 (2–6)
# Attribute 1+2+3 taxa	> 1 (0–3)	–	–		–
# Sensitive salamander taxa (if surveyed)	–	> 0	–	> 0	–
% Attribute 1+2+3 taxa	≥ 35% (30–40)		≥ 35% (30–40)		≥ 35% (30–40)
% Attribute 1+2+3 individuals	–		≥ 50% (45–55)		≥ 50% (45–55)
# Attribute 6t taxa	≤ 2 (1–3)		≤ 2 (1–3)		≤ 2 (1–3)
% Attribute 6t individuals	≤ 5% (3–7)		≤ 5% (3–7)		≤ 5% (3–7)
# Attribute 10 taxa	–		> 0		> 0
BCG Level 3	**Small**		**Medium**		**Large**
# Attribute 1+2 taxa	–		–		≥ 1 (0–2)
# Attribute 1+2+3 taxa	≥ 2 (0–4)		–		–
% Attribute 1+2+3 taxa	–		≥ 25% (20–30)		≥ 25% (20–30)
% Attribute 1+2+3 individuals	≥ 25% (20–30)		≥ 25% (20–30)		≥ 25% (20–30)
% Attribute 5 individuals	–		–		≤ 40% (35–45)
# Attribute 6t taxa	≤ 2 (1–4)		≤ 2 (1–4)		–
% Attribute 6t individuals	≤ 15% (10–20)		≤ 15% (10–20)		≤ 15% (10–20)
# Mid-water cyprinid taxa	> 0		> 1		> 1
BCG Level 4	**Small**		**Medium**		**Large**
# Attribute 1+2+3 taxa	> 1 (0–3)		> 1 (0–3)		> 1 (0–3)
% Attribute 1+2+3 individuals	≥ 5% (3–7)		≥ 10% (7–13)		≥ 10% (7–13)
% Most dominant Attribute 5a or 6t individual	≤ 65% (60–70)		≤ 65% (60–70)		≤ 65% (60–70)
BCG Level 5	**Small**		**Medium**		**Large**
# Total taxa	> 4 (3–6)		> 4 (3–6)		> 4 (3–6)
# Total individuals	> 100 (90–110)		> 100 (90–110)		> 100 (90–110)
% Attribute 5+6t taxa	–		≤ 65 (60–70)		≤ 65 (60–70)
% Attribute 5+6t individuals	–		≤ 90 (85–95)		≤ 90 (85–95)

Additional expert panel findings include:

- One headwater site within the TMC watershed (King Spring-LSTM110) was identified as a high quality stream (BCG level 2) with taxa comparable to State of Maryland Sentinel Sites (Figure 5). Impervious cover for these BCG level 2 sites was at 3% or below. Three other TMC sites with impervious cover ranging between 4% and 11% were rated between BCG levels 3 and 4 (lower condition). The sites that were approaching BCG level 4 were considered by the experts as candidates for cost effective restoration.

- Sites within the TMC watershed having higher levels of impervious surface were assessed as lower quality. These more degraded sites had elevated levels of specific conductance, an indicator of urban runoff. However, tributaries in excellent to good condition, like King Spring, serve to dilute specific conductance in the lower mainstem TMC.

- Sites within the Piedmont with levels of impervious surface typically higher than 4% showed increasingly degraded aquatic communities. Figure 6 shows average BCG level assignment for benthic macroinvertebrate sampling sites with % sensitive species plotted against % impervious surface. Increased level of impacts can also be caused by confounding and synergistic effects of other stressors.

- Across Montgomery County both fish and benthic macroinvertebrate assemblages are assessed. Invertebrates serve critical roles in stream ecosystem functioning in addition to providing food and energy to downstream vertebrate consumers such as fish and salamanders. In some instances, the experts tended to assign lower ratings for the fish community; this was generally attributed to prevention of native fish migration due to dams and other obstacles. Additionally, there was evidence of intrusion of lake fish species from reservoirs. However, there was sufficient fish habitat and food supply (the benthic macroinvertebrates) to support re-introduction of native species, such as brook trout or migration of other species, such as eel. Depending upon existing temperature regimes, these sites might be excellent sites for re-introduction of native and migratory species.

The decision rules were considered by experts to be applicable to the larger Piedmont region and with minor modification to reflect climate and other latitudinal gradients, useful for assessing biological condition in Piedmont regions in Virginia, Delaware and Pennsylvania.

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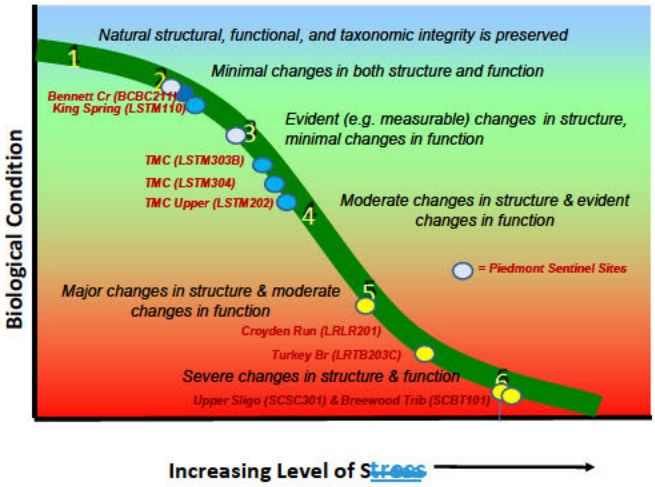

Figure 5. Comparative BCG assessment ratings of macroinvertebrates within TMC. LSTM number identifies the specific sampling site (blue dots), example Piedmont Sentinel Sites (light blue dots), and similar stream types with higher levels of anthropogenic disturbance (yellow dots).

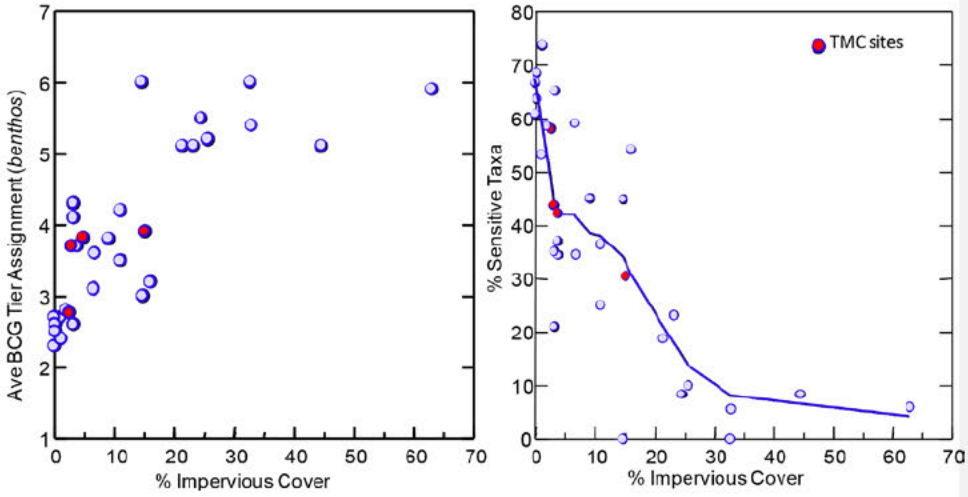

Figure 6. Relationship between average BCG level assignments (left) and % Sensitive Taxa (right) versus % impervious cover. This analysis included sites from throughout the Piedmont Region in Maryland. Ten Mile Creek sites are indicated (red dots).

6.6.4 Use of the BCG Model in County Planning Decisions

Based on the findings in the environmental analyses associated with the proposed Limited Amendment, the County planning staff and ~~program~~ MCDEP scientists concluded that there was significant uncertainty whether high quality aquatic resources assigned special protection, such as TMC subwatershed and streams, would be protected under the 1994 plan. The county planning ~~staff~~and MCDEP staff provided several possible development scenarios with predicted outcomes and recommended one option that would modify development in the TMC area while maintaining good environmental conditions (M-NCPPC 2014b). The ~~county~~ County ~~council~~ Council accepted the recommended option and it was adopted on April 1, 2014.

The BCG was used in conjunction with~~,~~ expert testimony ~~peer,~~ peer review literature research, modeling, and the environmental analysis to inform the County's decision to adopt the 2014 Limited Amendment for Clarksburg. This amendment revised zoning restrictions outlined in the 1994 Master Plan to reduce the impact of development on TMC. The 1994 Master Plan allowed a total impervious cap of 9.8%, while the Limited Amendment proposed a 6.3% impervious surface cap for new development in the most sensitive subwatersheds but allows a maximum of 15% impervious cover in the Town Center District. It also included a recommendation for increasing forest cover to 65% of the watershed and increasing the size of riparian buffers to better protect the streams and tributaries (M-NCPPC 2014b).

In 2014, the Montgomery County Council adopted the Limited Amendment to the 1994 Clarksburg Master Plan, which focused on TMC. The 2014 Limited Amendment concluded that TMC "warrants extraordinary protection," and offered recommendations for additional zoning restrictions that would allow for continued development, while continuing to study how development and mitigation activities (e.g., implementation of ESD) might affect sensitive water resources in the TMC watershed (M-NCPPC 2014a). The most sensitive streams or tributaries in the TMC system, such as the King Spring~~s~~, are currently at less than 1% impervious cover, so ~~that~~ a cap of 6% will likely result in a decrease or loss of some sensitive species and change from *excellent* to *good* condition. However, the amendment provides for consideration of additional measures (e.g. expanded stream buffer protections) and technology (e.g. ESD) ~~-~~that may minimize these changes (M-NCPPC 2014a). The use of the BCG along with other data, information, and expert testimony, successfully brought scientific information into the decision-making process and provided for informed decision-making that balanced multiple public and private concerns and priorities.

6.6.5 Lessons Learned

Montgomery County found that the BCG framework was a good tool to better articulate current conditions in TMC and illustrate how water quality could be impacted by future development. The 2014 Limited Amendment will allow for continued development with some restrictions on impervious cover. Because the BCG can be used to detect incremental changes in water quality county scientists will be able to closely monitor the effects of using ESD and other best management practices to mitigate the impacts of development on sensitive waters. County officials found that the BCG gave experts and the public a common understanding of water quality issues and allowed for informed policy making.

Commented [m6]: Stream health

In the future, the County ~~might~~ plans to ~~consider using~~use the BCG framework to examine restored sites and identify incremental improvements or declines in ~~water quality~~biological condition. Future use of this information might also include using county data for setting restoration targets. In addition, the BCG might be used as one way to reconcile databases maintained at the county-level with those at the state

level. Ultimately, one goal of such an effort might be to have county-level data used by the state when classifying streams.